

Notice of Allowability

Application No.

09/491,353

Examiner

Herng-der Day

Applicant(s)

CIRAK ET AL.

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment received 8/6/04 and 11/9/04.
2. ☒ The allowed claim(s) is/are 1,4,5,9,12,13,17,20 and 21, now renumbered as 1-9.
3. ☒ The drawings filed on 26 January 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☒ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>11102004</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

1. This communication is in response to Applicants' Amendment to Office Action dated April 7, 2004, faxed August 6, 2004, and Applicants' Supplemental Amendment faxed November 9, 2004.

1-1. Claims 1, 4, 9, 12, 17, and 20-21 have been amended. Claims 2-3, 10-11, 16, 18-19, and 22-32 have been cancelled. Claims 1, 4-5, 9, 12-13, 17, and 20-21 are pending.

1-2. Claims 1, 4-5, 9, 12-13, 17, and 20-21 have been examined and allowed.

Oath/Declaration

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §602.01 and §602.02.

The oath or declaration is defective because:

(1) Applicants Cirak and Schroeder have not given a post office address anywhere in the application papers as required by 37 CFR 1.33(a), which was in effect at the time of filing of the oath or declaration. A statement over Applicant's signature providing a complete post office address is required.

(2) The filing date of the provisional application is incorrect.

Reasons for Allowance

3. The following is an Examiner's statement of reasons for allowance:

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3-1. The closest prior art of record discloses:

(1) A method of generating a model of an object for use in finite element analysis (Groothuis et al., U.S. Patent 5,581,489).

(2) An unified FEM-based approach for arbitrary subdivision schemes (Mandal et al., "A Novel FEM-Based Dynamic Framework for Subdivision Surfaces").

(3) A technique to evaluate Loop subdivision surfaces at arbitrary parameter values (Stam, "Evaluation of Loop Subdivision Surfaces").

3-2. Independent claim 1 is directed at a method for computing a mechanical response of a modeled shell. This independent claim identifies the distinct combination of features of "characterizing an environment for the shell, including environmental factors affecting mechanical behavior of the modeled shell, the environment factors including loading conditions, material properties, and boundary conditions for the modeled shell, and the loading conditions including an indication of applied forces" and "computing by a computer a mechanical response of the modeled shell, taking into account said environmental factors, using a finite element analysis to compute a deformed geometry of the modeled shell, including generating smooth interpolated displacement fields possessing bounded energy according to a nonlocal subdivision-surfaces-based interpolation scheme, without using nodal rotations, such that resulting displacement fields defined over overlapping patches combine conformingly to define a limit surface" as shown in Figure 13 and argued by Applicants at pages 9-10 in the Supplemental Amendment. This distinct combination of features has not been uncovered in a single teaching, nor would a modification of prior art references be obvious to one of ordinary skill in the art to

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yield these limitations in the context of the claim. Claim 1 and its dependent claims 4-5 are deemed allowable.

3-3. Independent claim 9 is directed at a system for computing a mechanical response of a modeled shell. This independent claim identifies the distinct combination of features of “characterizing an environment for the shell, including environmental factors affecting mechanical behavior of the modeled shell, the environment factors including loading conditions, material properties, and boundary conditions for the modeled shell, and the loading conditions including an indication of applied forces” and “computing by a computer a mechanical response of the modeled shell, taking into account said environmental factors, using a finite element analysis, including generating smooth interpolated displacement fields possessing bounded energy according to a nonlocal subdivision-surfaces-based interpolation scheme, without using nodal rotations, such that resulting displacement fields defined over overlapping patches combine conformingly to define a limit surface” as shown in Figure 13 and argued by Applicants at pages 9-10 in the Supplemental Amendment. This distinct combination of features has not been uncovered in a single teaching, nor would a modification of prior art references be obvious to one of ordinary skill in the art to yield these limitations in the context of the claim. Claim 9 and its dependent claims 12-13 are deemed allowable.

3-4. Independent claim 17 is directed at a computer program for computing a mechanical response of a modeled shell. This independent claim identifies the distinct combination of features of “characterizing an environment for the shell, including environmental factors affecting mechanical behavior of the modeled shell, the environment factors including loading conditions, material properties, and boundary conditions for the modeled shell, and the loading

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conditions including an indication of applied forces” and “computing by a computer a mechanical response of the modeled shell, taking into account the environmental factors, using a finite element analysis to compute a deformed geometry of the modeled shell, including generating smooth interpolated displacement fields possessing bounded energy according to a nonlocal subdivision-surfaces-based interpolation scheme, without using nodal rotations, such that resulting displacement fields defined over overlapping patches combine conformingly to define a limit surface” as shown in Figure 13 and argued by Applicants at pages 9-10 in the Supplemental Amendment. This distinct combination of features has not been uncovered in a single teaching, nor would a modification of prior art references be obvious to one of ordinary skill in the art to yield these limitations in the context of the claim. Claim 17 and its dependent claims 20-21 are deemed allowable.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion


5. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The Examiner can normally be reached on 9:00 - 17:30.

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If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Jean Homere can be reached on (571) 272-3780. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Herng-der Day *H.D.*
November 15, 2004


JEAN R. HOMERE
PRIMARY EXAMINER